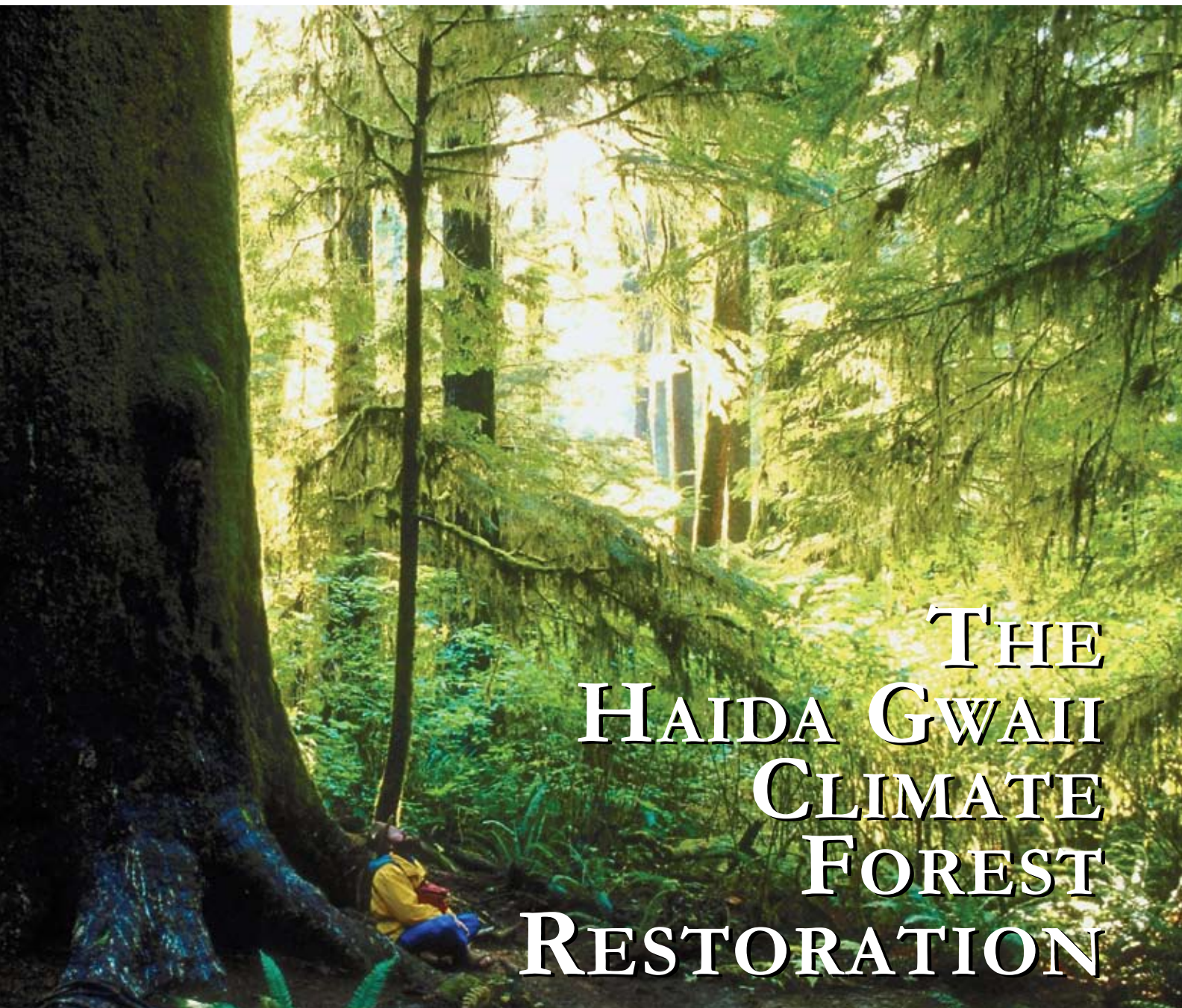
CANADIAN
# SILVICULTURE
NOVEMBER 2007



# The Haida Gwaii Climate Forest Restoration

- Adaptive Forest Management in Newfoundland & Labrador
- Ecosystem Management
- Forest Nursery Development

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# Editorial

*by Dirk Brinkman*

## Reforesting Climate's Disturbances

New housing demand in the US is the primary market for Canada's sawmill products and that market is in one of its deepest down cycles in 35 years. Historically, that means a down cycle for the silviculture industry will follow. Fire and pest disturbances from warm winters and drier summers due to climate change is up, however, and has the potential to create a counter cycle of reforestation demand. The challenge for the silviculture industry is to work with government and through public awareness to secure appropriate funding and implementation. This requires a level of public debate not seen from the silviculture industry since the years when "reforest what you reap" became law.

A twelve month inventory of new homes accumulated in the US market will have sub-prime bank re-possessions added to the unsold housing backlog by early next year. Despite the bullish US economy, new home building will continue to fall off until inventories are below five to six months. Combined with stockpiles in US lumber and Canadian mill yards, sawmilling and logging may be down for the next two years, dragging the by-product pulp chip supply across Canada down with it.

While reforestation in the east will decline with the sawmilling market, the demand for reforestation in the west is growing, because unfortunately, harvest disturbances are not the only market driver for reforestation. Pest populations are disturbing many times the area Canada harvests annually, as is well illustrated in *Managed forest sinks and sources 1990-2005* from *Is Canada's Forest a Sink or Source?* CFS Science Policy Notes.

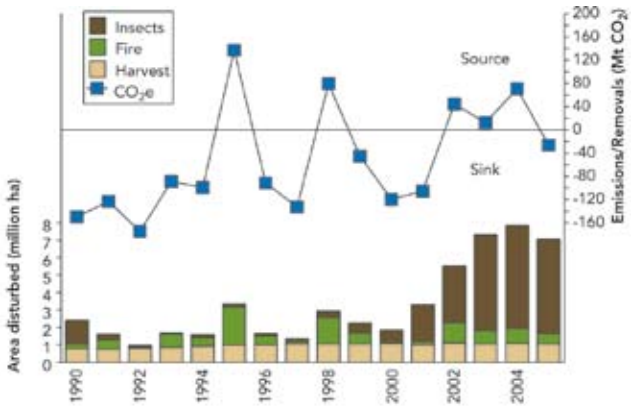
CFS analyzed hundreds of scenarios to 2012 from recent data, finding it 90% likely that there will be even more wildfire and pest disturbances. These scenarios did not factor in the effect of climate change nor the invasion into Alberta of the MPB. (Alberta's planned fall blitzkrieg fire to create a food free zone ahead of the beetle invasion was foiled by wet weather.) A high level of certainty that there will be more fire and pest disturbances in the coming years creates a unique and potentially overwhelming new reforestation challenge.

The MPB has disturbed over 9 million hectares in BC, so BC's response will become a template for predicted disturbances in other provinces. This is the largest catastrophic infestation in North American forest history. Of course it has added to the sawmill market surplus supply problems and the market simply cannot accept such a large salvage volume. Plans for 8 to 15 years of pine salvage harvest are grinding back to 3 to 5 years as dried logs check and then shatter profit margins under blades designed for wet wood processing. If less wood is harvested less of the reforestation will be funded by industry.

BC has offered million cubic meter bioenergy tenures for the standing dead on the same basis, reforest what you reap, with viability depending on the forest sector utilizing the highest value wood and on government commitments to support kilowatt pricing, transportation, carbon, or other enablers to bringing an adequate scale for this new industry into the forests. The energy industry knows how to lobby and of course, the pulp sector is protesting bioenergy subsidies, as competition for sawmill waste is increasing fibre prices and threatening billions in pulp mill and infrastructure investment. Government will have to cut through this conflict because the traditional forest sector cannot absorb BC's standing dead pine volume and the bioenergy harvest will add enormously to BC's economy.

Not all sawmilling companies can survive the long cash flow drought without restructuring and pressure on the provinces to review all forest tenure arrangements will be intense. During the last down cycle, some industry restructuring defaulted silviculture obligations to the BC government. Even Ontario's reforestation trust funds, designed to protect against stranding future reforestation obligations, have some exposure during restructuring as they can be advanced into company cash flows before work is complete. Silviculture industry vigilance will be required to protect harvests' reforestation obligations.

The beetle disturbance will be the largest forest driven social disruption in Canadian history and the mayors of the remote resource towns that are soon to be without resources are demanding solutions. Government will attempt to avoid Forest Renewal BC's failed experiment to employ laid off local loggers planting trees and spacing, but the circumstances that spawned BC's biggest boondoggle are back with a vengeance and government must respond.




Managed forest sinks and sources 1990–2005.
*Source: Natural Resources Canada*

In 2004, the BC government initiated Forests for Tomorrow to reforest Firestorm 2003's intense fires for areas where there was little salvage wood. This program's initial 5 million trees has shifted to MPB stands and is scheduled to scale up to 25 million/year by 2009. Provisionally, government has targeted young stands (<60 yrs) and is busy surveying to create a "map of the dead" and confirm its estimated 25 million/year plan. The program for reforesting these areas is being delivered by the silviculture sector through public tender, and may soon have to be scaled up.

Pine regenerates vigorously and Forests for Tomorrow only targets a small portion of the <60 year-old stands. Future forest ecosystem models that anticipate climate change may recommend that BC's Forests for Tomorrow program should not be seeded from forests of yesterday. If these models recommend seed adapted to warmer, drier, or wetter climates a greater proportion of the area may require artificial reforestation from more climate-appropriate seed sources.

Even if bioenergy harvesting kicks in, the scale of Forest for Tomorrow's public program may hurdle all precedents in federal/provincial forest negotiations. The bioenergy industry's counterpart, the oil sector, set precedents for federal subsidies that the forest sector has never been able to negotiate. Forest restoration of catastrophic scale fire and pest disturbances will also be critical to mitigating climate change. These unfortunate times offer the reforestation industry a unique challenge.

Let's make sure BC's provincial/federal MPB stewardship response sets appropriate precedents for all of Canada.

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# Letters to the Editor

***Re: August 2007 Issue - Land Use Planning***

*In this article Larry Innes states "our rate of deforestation is among the highest in the world". This is absolutely untrue and in fact the situation is in the total reverse - Canada is a world leader in maintaining its forest condition. Canada retains more original forest area (91%) than any other country in the world (*World Resources Institute Data Tables*, 2000-2001). Canada's rate of deforestation is zero and has been for over two decades (*FAO State of the World's Forests *report issued in March 2007). Canada has more protected forest than any other country - over 40 million hectares (*A Global Overview of Forest Conservation*, WCMC, UNEP, CIFOR, 1997).*

*In the opening sentence he states that "we also have an unprecedented opportunity to become global leaders through wise stewardship of our boreal forest." Canada is the global leader in wise stewardship of forests. Not only have we conserved more of our original forests, protected more of our forests than any other country, and have no deforestation, but Canada is home to 40% of the world's third party certified forests (FSC, CSA, SFI). Canada has three times more certified forest in the boreal than any other country has certified in total. The Canadian forest industry has reduced its GHG emissions by 44% since 1990, far exceeding the Kyoto target. Currently 18% of global GHG emissions come from deforestation, with half of global deforestation in Brazil and Indonesia (*The Economics of Climate Change*, Nicholas Ster, 2006). Other organizations such as the Global Canopy Program are advocating that other nations follow in adopting sustainable forestry, "there is a pressing need... to supply sustainably managed timber meeting the highest certification standards" (*Forests First in the Fight Against Climate Change*, June 2007). We are the leader that others are following.*

*Canada has done an exceptional job ensuring that Canada's forests are regenerated promptly and successfully. All Canadians can be proud that we are world leaders in sustainable forest management - no one does better.*

*Dave Kmet, RPF, RPFT, Director of Forestry, Alberta Forest Products Association*

*I like the magazine. As a member of CIF I am glad to recieve it. I think the article on Land Use Planning in the August 07 issue should have been reviewed with a more critical eye.*

*There are two comments that in my opinion are nonsense .There is a statement that there are 67 million tonnes of carbon in the trees of the Boreal Forest. The Boreal Forest covers 340 million ha. Granted that not all of it is closed canopy forest, but that averages out to 0.2 tonnes of carbon per ha. Seems to me this is a ridiculously low figure.There is a statement that Canada's rate of deforestation is among the highest in the world.*

*Deforestation has a meaning. It does not mean whatever we would like it to mean. 'Alice and the Queen' should not write for your magazine. Deforestation is the more or less permanent removal of trees and the conversion of the land to some other use. Like agriculture or a parking lot. I say more or less permanent because 'permanent' like 'never' is a long time.*

*Canada is not deforesting on any measurable scale. Au contraire - the area of forest in Canada is probably increasing slightly as marginal and sub-marginal agricultural lands go out of agricultural use and go back under forest cover through natural regeneration or planting. This is not well documented because I do not think our land use inventory programs are designed to pick up this data on a consistent basis.*

*And then having weakened the credibility of all statistics in the article we come to the famous 'more than 1500 leading scientists' quote. I don't think I believe that figure either. Please don't print puffs for interest groups. It will inevitably weaken your reputation with the forest practioners who are the main audience for the magazine. Stick to technical articles and news on silviculture.*

*Tony Rotherham, RPF (BC and Ont)*

# Response

*We stated in our August 2007* Canadian Silviculture *article that "our rate of deforestation is the highest in the world". This is incorrect. On a national scale, Canada's rate of deforestation is low, relative to other countries. According to the CCFM, the most recent estimate of total deforestation across all sectors (including forestry, energy, and agriculture) from 1990 to 1998 in Canada was 54,700 to 80,050 hectares a year, or between 0.01% and 0.02% of our forest land base.*

*However, this national statistic does not reflect the on-the-ground reality of deforestation in certain regions. For example, forest cover in the Alberta-Pacific Forest Management Agreement Area decreased by 3% over the past several decades, largely as a consequence of increases in oil and gas activities within the tenure. Reports prepared for the National Round Table on the Environment and the Economy have predicted that deforestation within the AlPac tenure will amount to 380,000 hectares or 7% of the total land base as new oil sands developments come online.*

*By any measure, this is significant. If Alberta-Pacific - a leading member of the Boreal Leadership Council operating an FSC-certified tenure - is unable to maintain forest cover because of land use decisions and resource allocations relating to other sectors, we clearly need to reform our land use regime in order to achieve our collective goals.*

*We would also like to correct a typo which appeared in the article. The amount of carbon estimated to be contained in Canada's boreal forest should have been expressed in billions of tonnes, not millions of tonnes.*

*Larry Innes, Executive Director, Canadian Boreal Initiative*

***Please accept this apology to readers for overlooking a "deforestation" statement that insults both the Canadian forest sector and the silviculture industry. The industry does not need gratuitous invalidation added to its challenges. - Dirk Brinkman, Editor***

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# New Research Guides Ecosystem Management

*by Sylvie Gauthier, Marie-Andrée Vaillancourt, and Yves Bergeron*

Ecosystem management is a concept that emerged in western North America in the 1990s as the extent of logging activities and concomitant threats to species encouraged the adoption of ecologically sensitive forestry practices. This shift has been observed in several Canadian provinces with various initiatives such as the ecosystem-based BC Forest Practice Code and Ontario Ministry of Natural Resources' Forest Management Guidelines. In Québec, the Coulombe Commission, an independent inquiry on forest management held in 2004, made the recommendation that an ecosystem-based forest management regime be implemented on public lands. As this recommendation created important expectations from the public, forest industries now need information on how ecosystem management (EM) frameworks must be designed and implemented throughout Québec's forested land. The results from research projects conducted within the Sustainable Forest Management Network are providing important insights into the ways natural forest disturbances can develop ecological forestry.

Numerous studies have been conducted, especially in the boreal zone, to promote the understanding of forest dynamics and functioning, and how forest harvesting practices can more accurately maintain or create conditions similar to those induced by natural disturbances on the landscape. One of the fundamental findings of this work is that the boreal forest is a system that is more complex than originally thought. In fact, complex fire patterns, insect infestations, and windthrow create considerable diversity in forest conditions. This leads to the following question: how can forest management deal with and maintain such complexity? This is exactly what EM is about.

## What is ecosystem management?

Defining EM is not an easy task and agencies have their own definitions. However, there is consensus on the main goal and characteristics of EM. According to the Coulombe Commission, the main goal of EM is to maintain biodiversity and viability of all forest ecosystems while meeting socio-economic needs with respect to social values linked to the forest. Adopting EM in forest policies and practices implies a major change of perspective notably with regards to spatial and temporal scales. Since forest ecosystems have variable boundaries and change over time, forest management must integrate larger spatial and temporal scales. Furthermore, EM must be based on relevant, scientific knowledge about forest dynamics and natural disturbances while being flexible enough to integrate new findings and uncertainties.

Knowledge of natural disturbance effects and variability should guide the development of management strategies that complement natural forest conditions. Integrating this knowledge does not mean that we can mimic nature. Instead, we can use our understanding of natural ecosystem functioning and disturbance dynamics and their effects on the forest mosaic to conceive management strategies and silvicultural methods that can reduce the negative impacts of forestry practices. Using natural disturbances as a template to develop an EM framework is probably the best way to maintain biodiversity in forest ecosystems while ensuring that forest productivity and associated economic activities are maintained over the long-run.

*the proportion of*

# *old-growth forest cover*

*has decreased*

Implementing an EM framework can be accomplished in five steps:

1. Reconstitution of the natural disturbance regime and long-term evolution of forest stands following disturbance.

2. Comparative analysis of natural and managed landscapes and identification of the main differences.

3. Fixing management objectives and silvicultural actions to minimize differences between forest management and natural forest dynamics.

4. Implementation of silvicultural actions in the context of a forest working plan that takes into account social acceptability and economic feasibility.

5. Monitoring interventions to evaluate management objectives and modify silvicultural actions if needed.

## Is even-aged management ecosystemic?

The assumption that the boreal forest was characterized by the occurrence of large and severe fires occurring approximately every 100 years has justified the use of clearcutting. However, recent results have shown that in many boreal regions fire intervals exceed 100 years, leading to large areas of old-growth forest cover. The proportion of old-growth forest cover has decreased due to current even-aged forest management practices, which risk the biodiversity and viability of these ecosystems. To reduce this risk, alternative forest practices recreating old-growth conditions must be developed and deployed on the land base.

Knowledge of historical fire intervals can help determine even-aged management targets within a global EM strategy. In many parts of the boreal forest, fire occurs less frequently than it used to. Thus, even-aged management systems could be used to replace the proportion of territory that would have burned under past fire regimes. (However, in a large proportion of the forest management units, this even-aged management has to be complemented with other silvicultural treatments aimed at maintaining old-growth characteristics.) Fire size and configuration must also be considered when planning harvest block dispersion in even-aged systems. Fires can range in size from small fires covering less than a hectare, to large fires covering thousands of square kilometers. Like fire, forest management tends to create large regenerating areas. However, large fires don't occur that frequently. To recreate patterns of fires, harvesting should be variable in size and large regeneration areas could still be created. However, they should be distributed within a management unit in order to keep large tracts of both mature and old-growth forest in which alternative practices could be used to compensate for the reductions of even-aged management areas.

## Alternative management practices

Silvicultural practices aimed at maintaining structural and compositional characteristics of overmature stands within treated stands could, in the boreal forest, guarantee maintenance of habitat diversity while slightly affecting allowable cut. Forest stands that have not been affected by fire for a long period of time are more susceptible to be affected by other disturbances such as insect outbreaks and windthrow which, like fire, have variable effects on forest stands with respect to size, frequency, and severity of disturbance events.

Thus, it is possible to treat some stands by partial and select cuts in order to reflect the dynamics of old-growth stands. Several uneven-aged practices exist in silviculture, but for economic and productivity reasons, these techniques have not been widely used in boreal forests to date. However, with EM management, managers can utilize a wider variety of silvicultural treatments which are closer to natural disturbances in relation to their impacts on the forest ecosystem.

It is important to note that the choice of silvicultural techniques used to set up the uneven-aged management system will depend on management objectives determined from natural disturbance regimes. Therefore, there is no single recipe in the utilization of such a management system. The key to creating appropriate silvicultural systems will be the creativity of the foresters and not adherence to a predefined set of rigid rules.

## Paludification

Paludification is the gradual conversion of a dry forest to a forested peatland through the accumulation of organic material. In the northern Clay Belt region (Québec and Ontario), forests are very susceptible to paludification because of the flat topography. Black spruce stands in heavily peated areas tend to become successively less productive because of the accumulation of organic matter. High severity fires can reverse the paludification process by consuming the organic layer while contributing to the recovery of stand productivity. On the other hand, low severity fires that do not consume the organic layer can contribute to the creation of unproductive forest stands with low tree density. Predominant harvesting practices (CPRS in Québec and CLAAG in Ontario) currently remove the tree layer while leaving the organic layer (forest floor) intact. Interestingly, although these practices were designed to increase yields and reduce regeneration costs by protecting advanced regeneration, their effect is similar to low-severity fires. Hence, these practices may be leading to increased paludification and significant losses in stand productivity. Alternative treatments that would reproduce the effect of fire on soil's organic layer include soil scarification disturbance and prescribed burning.

## Conclusion

Current forest management practices are eliminating old forest habitats at an alarming rate. One management option to avoid this outcome, with negligible impact on timber supply, is to rely more on uneven-aged silviculture. In some regions, to counteract paludification, the industry also needs to adopt silvicultural treatments that mimic natural disturbances such as fire to create a healthy, organic soil layer and productive stands.

Dr. Sylvie Gauthier is a research scientist at Natural Resource Canada - Canadian Forest Service working on the effects of fire on dynamics of boreal forests. She is the principal editor of an upcoming book on EM in boreal forests. She can be reached at sylvie.gauthier@cfl.forestry.ca. Marie-Andrée Vaillancourt is a biologist and co-edited the upcoming book with Dr. Gauthier. Dr. Yves Bergeron is professor at the Université du Québec in Montréal and the Université du Québec in Abitibi-Témiscamingue. He holds an industrial chair in sustainable forest management and a Canada research chair in ecology and forest management.

# Forest Health

*by Brian Aukema, Robert Hodgkinson, Dezene Huber, and Staffan Lindgren*

## Eating Themselves Out of House and Home: Mountain Pine Beetle Attack *Spruce*!

The current outbreak of mountain pine beetle (MPB) in BC, and now Alberta, has attracted immense media attention as it has rolled through more than nine million hectares of mature lodgepole and ponderosa pine. Mountain pine beetles breed in almost all pines, raising concern that the insect may expand into the jack pine of the boreal forest that stretches across Canada to the Maritimes. Behind the eastern front, most of the insect's typical food supplies have been exhausted. For example, in many parts of the central interior of BC, the insect, facing starvation, is increasingly attacking young lodgepole pine and, to a much lesser degree, mature spruce.

For mountain pine beetles to successfully reproduce in trees, two things must occur. First, there must be enough insects to successfully overwhelm the tree's defensive capacities. Mountain pine beetles use chemicals known as pheromones to attract their mates to trees en masse. This mass attack, in concert with fungi vectored by the beetles, is able to kill mature trees in outbreak conditions. Second, the subcortical tissue of the trees, once gained, must be suitable for brood to develop. For example, while stands of small-diameter juvenile lodgepole pine killed by mountain pine beetle may pose serious challenges for the future timber supply, attacking such trees is actually a dead end for the beetle as a reproductive strategy. In young pine with diameters less than approximately 17 cm, the phloem, which the insects eat, is simply too thin for larvae to mature to adults.

Over the past two years we have noted a number of successful colonizations of mature interior hybrid spruce by MPB. In truth, attacks by MPB on spruce have been documented several times in the past one hundred years, stretching back to records from the father of forest entomology, A.D. Hopkins, in 1921. Such attacks often occur when the insects are abundant, such as during outbreak conditions. As a rule, however, the attacks are not very successful. Spruce trees are rarely killed, and even if the trees are colonized, the broods rarely develop to adults. Thus, we have been surprised to find that brood production in spruce, at least in the wake of the current outbreak, may be sufficient in some instances to result in a new generation of beetles emerging to attack new trees!

We are conducting research to address four potential hypotheses for why MPB are reproducing in the occasional spruce. First, this so-called epiphenomenon may be simply due to the unprecedented population pressure given the magnitude of the current outbreak. Second, we may be witnessing an exceedingly rare, but not impossible, host switch. Species of bark beetles in the genus *dendroctonus* exhibit many different host preferences. Some attack all pines, others only one, while others attack only spruce or Douglas-fir, or larches. A likely step in the speciation of tree-killing bark beetles that specialize on certain hosts is the formation of "host races" or strains that become reproductively isolated in different tree species. Third, differences in the population genetics or characteristics of MPB between locations may be facilitating the phenomenon. Perhaps there are always a few insects that are able to colonize spruce, but it has taken until the current outbreak to concentrate sufficient numbers in one location. Finally, the phenomenon simply may be due to site-specific characteristics of these individual spruce trees, and not the insects at all. There may be something unique about the trees' vigour, physiology, and beetle susceptibility that have made them desired candidates versus other nearby spruce.

We are currently studying colonization behaviour, reproduction potential, and fungal transmission by MPB in spruce using a combination of laboratory and field experiments. Our research, based at the University of Northern British Columbia (UNBC), is aided by graduate and undergraduate students at the institution and collaborators at the Canadian Forest Service Pacific Forestry Centre in Victoria, the BC Ministry of Forests, and UBC. To date we have drawn only one conclusion after reading Hopkins and others' initial notes in this subject area: the bugs never read the scientific literature!


*Dr. Dezene Huber from the University of Northern BC installs mountain pine beetle emergence traps on spruce on June 6, 2006.*

Brian Aukema (baukema@nrcan.gc.ca) is a research scientist in forest entomology with the Canadian Forest Service, Natural Resources Canada, based at UNBC as an assistant adjunct professor in the Ecosystem Science and Management program. Robert Hodgkinson (Robert.Hodgkinson@gov.bc.ca) is forest entomologist for the Northern Interior Forest Region for the BC Ministry of Forests and Range in Prince George. Dezene Huber (huber@unbc.ca) is an assistant professor and the Canada Research Chair in Forest Entomology and Chemical Ecology at UNBC. Staffan Lindgren (lindgren@unbc.ca) is a professor of forest entomology in the Ecosystem Science and Management Program at UNBC.

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# The Haida Gwaii Climate Forest Restoration

*by John Disney, on behalf of the Old Massett Village Council*

Recently, BC's government pledged to commit its many resources to the battle against climate change. The direction BC will follow is akin to that adopted in California, where serious emissions targets, taxes, and government subsidies promise to have significant, positive impacts on the state's environment and economy. One of the industries certain to be encompassed in Premier Gordon Campbell's initiatives is BC's long-standing forest sector.

There was once a belief that the forests of BC would yield an infinite and inexhaustible supply of lumber for the forest industry. Today some people think the atmosphere is an inexhaustible sink for pollutants and life will not be adversely affected by industrial emissions. But we are now faced with the realization, both in the worlds of climate change and forestry, that there is a limit to the natural resources of this world that must be respected. This new reality brings with it new challenges in balancing our energy, industrial, and economic demands with environmental realities.

The forest sector has accepted that excessive timber extraction has impacted the sensitive balance of forest ecosystems and the planet as a whole. It is also understood that, in order to successfully restore the delicate atmospheric and ecosystem balance that evolved over millennia, the forest industry must begin to make choices and undertake activities with an understanding of their impact on our planet as a whole. To begin, the forest ecosystem must stop being what the economists call an externality, and the environmental impact of forestry activities must be transparently accounted for at the industry's bottom line.

Every litre of fuel that is consumed in the manufacture or delivery of goods costs the producer at the bottom line, much as it costs the environment. The mantra of the environmental movement - reduce, recycle, reuse - also makes economic sense. It makes sense to audit manufacturing, resource extraction, and service industry activities to determine their impact on the planet, and assess how improvements can be made at every stage of these industries to increase their environmental, and economic efficiency.

The proponents of the Haida Gwaii Climate Forest Project believe that it is possible to increase the environmental efficiency of any given industry or activity, and that to do so will eventually increase its economic efficiency and profitability. For example, even the most neglected and un-monetized scrap of land can be audited and its environmental impact improved through the application of long-standing forest management techniques. This concept is the basis of the Haida Gwaii Project, which seeks to convert inefficient brush-dominated riparian reserve, park, and agricultural crop land into healthy, native conifer-dominated forest.

The land that is appropriate for this restoration activity is land that is otherwise unproductive to the forest sector. It is logged land that is protected as a riparian reserve zone, land that lies within protected parks, and land that was converted from forest for agricultural purposes but is no longer being used as crop land. What these different lands have in common is that they have ceased to be otherwise productive in the forest sector. It is for this reason that they lie untouched and are usually dominated by brush species.

While it is long recognized that these lands will eventually develop the old growth characteristics they bore prior to being logged, it is also generally acknowledged that restoration activities undertaken on these lands help to speed this natural process. The key to the Haida Gwaii Project is using the restoration activities themselves to make this land profitable again.

Once the land is identified and the necessary agreements entered into with the appropriate regulatory agencies, restoration work begins. The land is painstakingly restored to mimic the old-growth characteristics it possessed before it was logged.

Brush species are controlled and native conifer seedlings are arranged in a mixed-species planting. Wildlife habitat is mimicked in snags, which are left to provide inviting nesting and foraging habitat for native amphibians, birds, and mammals. Where this work is conducted on a riparian reserve zone, efforts are also made to improve the in-stream spawning habitat of native fish. Collectively, these activities help improve the overall biodiversity and environmental efficiency of the land. This activity also has a positive effect on climate change because it increases the amount of atmospheric carbon this once inefficient land converts into and stores as plant fibre. It is the net difference in sequestration capacity of the land post-restoration that is the monetized product that is sold in order to fund the restoration activities.

The Haida Gwaii Project also addresses one of BC's major social and economic problems. The project is spearheaded by the people of the Haida Gwaii and represents a real solution to the serious economic and unemployment issues faced, in particular, by the Haida of the Queen Charlotte Islands. This project represents a stable source of employment for the Haida that is founded not on harvesting natural resources, but in payment for the atmospheric benefits of restoring the land to its native biodiversity and health. As such, it is employment that is far more in keeping with the Haida cultural values and beliefs.

The Haida Gwaii Project arose out of a desire to meet the demands of an increasingly challenging and competitive global forestry market with an innovative way to fund important environmental restoration activities. It also arose out of an awareness that a significant portion of BC's forested land was not being managed due to the realities of the increasingly demanding global forestry economy. In the true spirit of sustainability, the project grew out of a belief that there was a way to fund the much needed restoration of these lands through the restoration benefits, and also provide much needed employment to one of BC's most genuinely depressed areas.

From a climate change perspective, the project will remove several mega tonnes of carbon from the global atmosphere over the course of the Haida Gwaii Climate Forest's monetized life of 100 years. At the same time, the province of BC will benefit from the restored riparian reserve zones and protected forests for the whole age of the forest, up to 1000 years. The project therefore represents not only an innovative approach to answering the challenges of climate change, but a long-term solution that has the very positive side effects of increasing the biodiversity, biomass, and health of otherwise neglected lands for the life of the forest ecosystem.

The Haida Gwaii Project represents the kind of innovation required to address BC's commitment to answering the climate change challenge. It also represents the kind of potential there is in our declining forest sector to answer this challenge through optimizing sometimes decades-old conventions and technologies. The proponents of the Haida Gwaii Climate Forest Project hope that those who read this article will look to their own professional activities and seek out how they can help bring solutions to the challenges of climate change while helping improve the health of Canada's forest ecosystems.

For more information on the Haida Gwaii Climate Forest Project, please contact John Disney, Economic Development Officer to the Old Massett Village Council on Haida Gwaii, by email at ecdev@mhtv.ca.

# Focus on Safety

*by Ron Gorman*

## It's Definitely Better Safe Than Sorry

I learned a valuable lesson as a young man, when a fire completely destroyed our company's sawmill, devastating our family business. But in the costly process of rebuilding, we diversified and modernized, and this led to positive long-term outcomes. We later grew in ways that probably wouldn't have been possible before the fire.

Today, three decades later, parallel events seem to be at work in BC's forestry sector - including its vital silviculture operations.

It's an understatement to say that we delivered a sorry safety performance for much of the twentieth century. In 2004, a provincial government task force documented deep-seated problems in a comprehensive report recommending far-reaching changes. They required serious investment by industry and major efforts by other players. But recognizing the need, everyone signed on: licensees, companies of all kinds and sizes, labour, the BC government and its forestry and safety agencies.

The industry took responsibility for improving safety. Collectively, we said, "This is unacceptable. This is our problem, and we're going to fix it." That's exactly what we did, individually and collectively. Since 2004, companies of all sizes and kinds have paid more attention to how we treat and practice safety. As an industry, we adopted the BC Forest Safety Accord, and formed the BC Forest Safety Council, using it to launch diverse programs that will, over time, fundamentally create a new safety culture.

From the get-go, we understood that this would be a long-term commitment. Attitudes don't change overnight, and programs take time to implement. It's very satisfying, then, to have a newly-released statistical analysis show that our efforts are starting to pay off in a big way.

On top of a steep year-to-year decline in fatalities, BC forestry in 2006 recorded reductions of 21.5% in injuries and 39.0% in injury costs.

These unprecedented one-year improvements involved major progress by silviculture:

• 6.5% fewer compensation claims - with 22.1 fewer claims by young workers, a major segment of silviculture employees

• 30.1% fewer days lost from work overall

The crucial benefits are fewer personal lives disrupted by injuries and higher morale, thanks to the forest sector's clear commitment to the safety of its workers and workplaces.

Changing attitudes in a large, diverse industry takes patience and hard work. Our forest sector has made a good start through the BC Forest Safety Council, with its training and certification programs for individual workers like manual tree fallers, and a SAFE Companies program that will ultimately certify all forestry operations as meeting and exceeding required safety standards. Complementing these programs are efforts by other players, including the government and WorkSafeBC, also taking positive actions to improve forestry safety.

Ultimately, however, it will be the cumulative effects of individual decisions and actions by individuals and companies that keep our businesses safe.

Maintaining our momentum won't be easy, as we're experiencing a difficult period in our history. But tough times should help us focus on what's critical to the long-term success of forestry in BC.

Our future depends on improved workplace safety, and safety investments today will pay dividends in a healthier industry tomorrow, one that is more dynamic, efficient and innovative - and able to assure workers and their families that earning a living doesn't come at the price of life and limb. That's a must for all forestry jobs, from falling to tree planting.

Co-chair of the BC Forest Safety Council director, Ron Gorman is chief executive officer of Gorman Bros. Lumber Ltd. Harvesting and milling timber in the Okanagan Valley, the 56 year-old family company is grooming its third generation of working owners.

# WESTERN

## SILVICULTURAL CONTRACTORS' ASSOCIATION

*by John Betts*

Lately I've been getting calls. What makes it interesting is that they're coming out of the blue from members of the general public; they're not foresters, they don't work in the forest industry, and they're mostly from the Lower Mainland or out of province. "What's going on?" they ask me, "I just drove to the Interior and the trees are all dead." Of course they know there is the mountain pine beetle and it kills trees. But they "had no idea it was like this." They are not alone in having no idea, not just about how extensive the plague is, but about what we are doing about it. Because that really is the question behind the question about what is going on.

As a species we don't do well with environmental catastrophe. It is simply too unsettling and deeply traumatic. Ask anyone who has ridden out an earthquake, or had to evacuate their home in front of a forest fire. No wonder people want to believe the massive environmental insult of billions of trees dead and dying across the province is being taken care of. It's what humans tend to do. We need to believe the world is ordered and predictable. This makes it all the harder to tell my callers that as far as I can tell there is no coherent or comprehensive response to what they've seen.



This summer, two major reports were released by the provincial government addressing the state of the forests and the timber supply in areas affected by the beetle infestation. Likely there was considerable fretting beforehand about the possible effect of these reports. The political class and many of their professional optimists are very averse to creating anxiety, it seems. But what was most disturbing to me was not the reports' distressing forecasts and options we face in many communities, but the absence of any urgency or a convincing strategy to enhance the prompt re-emergence of the once vigorous forests we depend on.

Of course, I tell my callers I am biased and perhaps not someone to rely on for an unprejudiced perspective. Then they surprise me by saying they expected that. This suggests they are more sophisticated in their understanding of how things work than I thought. That's confirmed by the questions they ask. Innocent of any ideological drift, the tone and tenor of these callers' queries may represent a growing segment of the public that genuinely wants answers and is prepared to sift through the commentary to make up their own minds. As I wade through the thicket of contradictions and paradoxes that make up a decent reply, I find them still with me at the end. Apparently this sampling of the population is not averse to complexity nor is it as indifferent to forestry as I may have thought.

We seem to live in an age when the least probable events drive the agenda. The mountain pine beetle is a good example. Is there a public groundswell out there gaining force, that improbable as it may seem today, may someday force our leaders into the boldness the present situation demands; something they have so far avoided? Or by believing this am I just exhibiting that human tendency to avoid the bad news?

# ONTARIO

## FOREST RENEWAL CO-OPERATIVE INC.

*by William F. Murphy, RPF General Manager*

What is a milestone? Bowater Woodlands Operation Thunder Bay just had one. They have just celebrated the planting of their 400 millionth tree seedling on crown land. This forest company has done over 25 years of regeneration work on several management units in Northwestern Ontario, indicating their commitment to the continued reforestation program originally outlined by the Ontario Ministry of Natural Resources (OMNR). There were dignitaries from the Thunder Bay Mill, woodlands, and from head office participating in the event as well as several groups, allied suppliers, and individuals who were part of the 25 year commitment. It was also the beginning of the Bowater "Urban Forest", designed by Bill Klages and Rick Groves, working with Megan Thompson, Haveman Brothers Forestry Services, the Lakehead University Timberwolves woodsman team, and the Bowater Mill crew. The first plantings of the urban forest were established with 2-4 year old conifer seedlings representing some of the species found on the Bowater management units and in the city of Thunder Bay.

*Bill Klages and Rick Groves standing in front of the new Bowater Urban Forest*

The Ontario government has made a commitment to Southern Ontario's afforestation program. In Phase 1 of the program, the OMNR, through its partnership with the Trees Ontario Foundation (TOF), will invest more than $4 million to support the planting of 2 million more trees by 2009. The OMNR will also work with TOF and its partners to build annual tree planting to levels that will meet the target of 50 million trees by 2020. We in Northern Ontario do have a concern that our 200,000 hectares of vacant land available for planting is not being addressed within this program. We are totally dependent on TOF and their decision to provide northern landowners with tree seedling stock. The last program, which was initiated by the federal government through the Canadian Forestry Service and implemented through TOF, was initially destined for Southern Ontario. Northern Ontario was allowed to participate when it was found that Southern Ontario landowners were not as well informed as they are now, or that they were not respecting the program due to the commitment of the landowner to supply some of the dollars. The difference between the two programs is that now TOF has a workable plan that has been in continuous motion for the past two years. Let's hope that 50 million trees do make it into the ground by 2020.


ASSOCIATION DES ENTREPRENEURS DE TRAVAUX SYLVICOLES
ASSOCIATION OF SILVICULTURE CONTRACTORS

## L'avenir des forêts au Québec se dessine

*par Audrey Harvey, Responsable des communications, AETSQ*

Certains se souviendront qu'à la fin 2006, on annonçait la tenue d'un sommet sur l'avenir des forêts au Québec. Le tout devait se dérouler au printemps dernier. Il y a eu consensus au sein des participants pour le reporter à l'automne. La raison en était bien simple : le délai était trop court pour faire une réflexion approfondie et déterminer les nouveaux cadres de la foresterie au Québec. Car c'est bien l'objectif ambitieux du Sommet sur l'avenir du secteur forestier québécois.

Le Sommet est plus que jamais au cœur des priorités des forestiers du Québec. Reporter l'événement a bien sûr amené son lot d'incertitudes. Certains en étaient venus à croire que l'événement n'aurait jamais lieu. D'autant plus que le président du Sommet, monsieur Denis Brière, a été élu recteur de l'Université Laval entre-temps. Il a d'ailleurs décidé de conserver son poste à la barre du Sommet. Mais les avantages ont été nettement plus considérables.

D'abord, cela a permis de revoir notre méthode de fonctionnement. Déjà, lors des travaux à la Forêt Montmorency, certaines idées avaient fait consensus. D'autres en étaient bien loin. C'est pourquoi il a été décidé d'identifier les thèmes ayant le plus besoin d'être approfondis et de les transformer en chantier de travail. Ils sont au nombre de six : la gestion par objectifs, l'intensification de l'aménagement forestier, l'innovation, la consolidation de l'industrie, la gestion intégrée des ressources et les aires protégées.

Bien que plusieurs étaient sceptiques vis-à-vis du sérieux de la démarche, l'avancement des travaux sur les chantiers en a convaincu plus d'un. En effet, depuis le milieu de l'été, les participants de ces chantiers ont eu le mandat de revoir le régime forestier sous toutes ses coutures. Le ministre Claude Béchard avait déjà invité les intervenants du secteur à refaire le régime comme s'il n'avait jamais été inventé. Le message a été entendu.

Le 13 septembre, les six chantiers de travail étaient réunis afin de faire le point sur les travaux effectués jusqu'à maintenant. Le constat est surprenant. En effet, on a pu voir que chacun a su mettre l'intérêt de la forêt québécoise avant ses intérêts corporatifs, ce qui a pour effet de donner des pistes de travail tout à fait intéressantes.

Reporter le Sommet a également été bénéfique parce que cela a permis d'instaurer un meilleur dialogue entre les différents groupes. Sinon, le temps aurait manqué et tous les efforts auraient été vains. À titre d'exemple, les médias mettent souvent l'accent sur les relations tendues entre le monde environnemental et les forestiers. Mais aux tables de discussion, c'est tout le contraire. Il y a une nette volonté de s'entendre et d'avancer ensemble dans la nouvelle façon de faire la foresterie. Les échanges sont des plus stimulants et les résultats qui pourraient en découler sont très prometteurs.

Pour les prochains mois, les chantiers continueront de se réunir. L'objectif ultime est de dégager des consensus au sein des chantiers. Ces consensus seront présentés publiquement lors de la tenue du Sommet du 10 au 12 décembre prochain à Québec. Des idées resteront probablement à être débattues. Le Sommet sera l'endroit idéal pour le faire. Les chantiers identifieront par la suite un plan de travail pour la mise en place des idées qui auront été retenues.

## The Future of Quebec's Forests Takes Shape

*by Audrey Harvey, Communications Coordinator, AETSQ*
*Translated by David Hayne*

Some readers will recall the announcement, at the end of 2006, of the holding of a summit meeting on the future of forests in Quebec. The event was to take place last spring, but there was general agreement among the participants that it should be put off until fall. The reason was obvious: the lead time was too short for the careful study required to create a new framework for Quebec forestry, which was the ambitious aim of the Summit on the Future of the Forestry Sector in Quebec.

The Summit is now, more than ever, among the major priorities of Quebec's foresters. Delaying the event certainly created a number of uncertainties, and some observers had begun to believe that it would never take place, since the president of the Summit, Denis Brière, had in the meantime been elected president of Laval University. He has, however, decided to retain his post at the helm of the Summit, and the advantages for the latter have clearly been considerable.

Firstly, we have been able to revise our method of operation. During the activities in the Montmorency Forest, certain ideas had led to agreement, but others were far from a consensus. That is why it was decided to identify the issues most in need of study and to assign them to working groups. There are six issues: administration of objectives; the intensification of forestry management; innovation, consolidation of the industry; integrated management of resources; and protected areas.

Although many were doubtful of the seriousness of the process, the progress of discussion in the working groups has convinced more than one sceptic. Since the middle of the summer, in fact, the members of these panels have had a mandate to reexamine the forestry regime from every angle. Minister Claude Béchard invited the participants to rethink the regime as if it had never been invented, and his message was understood.

On September 13, the six working groups were brought together to take stock of the work accomplished to date. The result was surprising. It was evident that each member had been able to put the interests of the Quebec forest above his own corporate interests, which had the effect of providing extremely interesting leads for future work.

Delaying the Summit was also beneficial because it fostered better dialogue between the various groups. Otherwise time would have run short and all efforts would have been in vain. The media often stresses the strained relations between the environmental community and foresters, but in these discussions, the opposite is true. There is a clear desire to reach agreement and to move ahead together towards a new concept of forestry. The exchanges are highly stimulating and the results that ensue will be promising.

Over the next few months, the working groups will continue to meet. The ultimate objective is to reach agreement. All conclusions will be presented publicly during the Summit from December 10-12 in Quebec City. Some ideas will require further discussion, and the Summit will be the ideal setting for this. The working groups will then develop a program for the implementation of the approved ideas.

# NOVA SCOTIA

## FEDERATION OF NOVA SCOTIA WOODLAND OWNERS

*by Andrew Fedora*

## Monitoring for Value and Compliance

The cost of carrying out silviculture work across Canada is steadily increasing. Any contractor involved with silviculture will readily attest to this and quote any number of reasons why. In an effort to help offset costs, most provinces have some sort of silviculture assistance program. For silviculture contractors in many provinces, it is becoming increasingly difficult to sustain a profitable business based on current rates and available assistance. For a small-private woodlot owner, direct assistance is almost non-existent.

Nova Scotia's approach to silviculture assistance programs is unique as compared to the rest of the provinces. On the surface, our program may seem to be one of the top in the country. However, small-private woodland owners and many who practice silviculture in Nova Scotia may have a different opinion.

On December 26, 2001, under the Forests Act, the Nova Scotia government enacted the *Forest Sustainability Regulations*. The regulations require any person or company, who attains more than 5,000m3 of wood fiber in a year to carry out silviculture work in Nova Scotia. The amount of work obliged is proportionate to the amount of wood volume acquired. Additionally, the amount of investment on private land is proportionate to the amount of wood harvested from private land.

As a registered buyer, you have two options; you can invest in the Sustainable Forestry Fund, or implement your own silviculture program. The regulations allow buyers who decide to run their own program a 10% reduction in silviculture work required. This is to offset the extra administrative costs for running a program. Who receives funding, the location, and treatment type, is at the buyer's discretion.

A third party organization distributes the Sustainable Forestry Fund. Any person may submit an application for funding. The funding is dispensed on a "first come, first served" basis. Provided the site meets the technical criteria, applications are accepted for a wide variety of treatments.

At first glance, there seems to be sufficient funding available for a variety of silviculture treatments in Nova Scotia. For many contractors and perhaps a few landowners, this may be the case. For the majority of small-private woodlot owners in the province, it is very difficult to receive funding and, if they are interested in carrying out the work on their own, near impossible.

Nearly every buyer (mill) in Nova Scotia decided to run its own silviculture program, and rightly so. The 10% for administration reduces the amount of silviculture the buyer is required to do. They can also leverage the promise of providing silviculture funding to a supplier for acquiring wood. Operating in this fashion is simply good business sense.

Since most buyers run their own programs, there is virtually no industry investment into the Sustainable Forestry Fund. The provincial government has been the most substantial contributor to the fund since its inception. Given the small amount of funding available and the "first come, first served" policy, the budget is often completely allocated the first day applications are accepted. Silviculture contractors in close proximity to the office from which the funding is administered typically claim the funds before others from greater distances have the chance to apply. Again, for the early birds, this is just good business sense. As a small-private landowner applying, if you are fortunate enough to have your application accepted, you receive less funding on a per-hectare basis than a silviculture contractor.

Keeping these points in mind, the small-private woodlot owner in Nova Scotia has very limited silviculture options. If they do not sell enough wood to a buyer and are not first in line for the Sustainable Forestry Fund, there are really no options at all.

### ASF SILVICULTURE FUNDING PROGRAM 2005-2006

| | |
|---|---|
| Funding Applied For | $772,055.93 |
| Funding Spent | $434,881.35 |
| Area Applied For | 1,473.9 ha |
| Area Treated | 798.8 ha |

*Source: www.asforestry.com/silviculture.htm*

# PEI

## DEPARTMENT OF ENVIRONMENT, ENERGY, AND FORESTRY

*by Ken Mayhew*

## Forest Seeds - A New Opportunity

In August 2007, the Watts woodlot located in Kilmuir in southeastern PEI, hosted a large group of land owners and entrepreneurs who were interested in the potential of a new forest product. While the Watts family grows Christmas trees, blueberries, and a range of high value hardwood and softwood products, their visitors were interested in the potential of forest trees, shrubs, and plants to produce another commercial product - seeds!

Jim and Karen Verboom from Nova Tree Company in Truro, Nova Scotia conducted the workshop. They explored the potential of a number of common forest plants and shrubs such as bunchberry, wild raisin, and beaked hazelnut. Participants discussed stand types and conditions associated with these species as well as the life cycle of the plants and how to collect and store seeds and berries. Additional attention was spent on trees species such as sugar maple and beech, both of which are well suited to landscaping needs of land owners in eastern North America.

Most of these plants are easy to find in a typical Island forest but forest cover and growing conditions will affect their abundance and seed production capabilities. Some participants were interested in propagating more plants in their forest, but as a rule, there are no silviculture techniques specifically designed for these species. Landowners can often encourage new growth by opening up the stand to increase sunlight on the forest floor, but care must be taken to do it over a period of years in order to prevent sun scald or overheating of the forest floor. As well, some landowners have had success transplanting shrubs and plants from other areas of their forest to sites better suited to the needs of the species.

The market for native forest plants is blossoming across North America as more and more people discover the benefits and pleasures of using native plant materials for their gardening and landscaping projects. Many native species produce vibrant flowers in a range of colours, beautiful spring and fall foliage, or edible berries and nuts. These species also tend to be very hardy because they are suited to local growing conditions, soils, insects, and diseases.

Traditionally, most gardening plants originated from Asian or European sources. Over the years, they were bred to produce more colourful and longer lasting flowers, provide shade, stabilize soils, and provide a host of other uses. However, in many cases these new species required a great deal of attention because of their lack of resistance to native insects and diseases or their inability to compete against native vegetation. For many property owners, this meant spending extra time weeding plant beds or increasing their reliance on pesticides to keep the non-native species healthy. In other cases, non-native plants were able to escape into the wild where they quickly became a nuisance or even threatened entire ecosystems.

These issues are not a problem when using native plants. There are more opportunities for native species such as staghorn sumac, red osier dogwood, striped maple, red oak, American mountain ash, eastern white cedar, white pine, and more. Each of these trees and shrubs adds colour, character, and beauty to our landscape and help to conserve our natural environment.

Forest seeds are another product that people can collect and sell to offset the costs of owning and managing forest land. While the returns are not huge, seed collection can be a fun and rewarding activity for young and old alike.

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# ADAPTIVE FOREST MANAGEMENT IN NEWFOUNDLAND & LABRADOR: Shaping the Future

*by Dave Poole*

The forest sector in Newfoundland and Labrador is similar to other jurisdictions across Canada with respect to Sustainable Forest Management initiatives and applying adaptive management techniques within Forest Management Planning. Since logging began on a commercial basis for the newsprint industry in the early 1900s in Newfoundland, there have been many changes relating to business organizations as well as forest management design and practices.

The original Anglo Newfoundland Development Company Ltd. was incorporated in 1905. It went through many changes before it became Abitibi-Consolidated. The International Paper Company of Newfoundland Limited was incorporated in 1927, and after mergers it became known as the Corner Brook Pulp and Paper Limited, a division of Kruger.

To supply these mills with raw material, the forest sector became active with men, axes, bucksaws, and horses canvassing the landscape in the pursuit of quality pulpwood. The harvested wood was then transported through river systems to the designated mill. Over time, production of pulpwood shifted to more mechanical means as chainsaws, harvesters, forwarders, and haul trucks were introduced.

## Forest Management Planning

Over the past century, the forest sector has seen increased demand in the number of users other than the newsprint industry, such as sawmills, outfitting, wildlife, tourism, etc. To accommodate multi-disciplinary demands, managers of Newfoundland and Labrador's forest sector were required to evaluate their management planning processes. Managers now have to ensure that regardless of the end product, merchantable volumes are harvested at sustainable levels and stakeholder involvement/input is imbedded into the production of sound management plans.

To do this, managers use an adaptive management approach that "assumes knowledge is provisional and focuses on management as a learning process or continuous experiment, incorporating the results of previous actions and allows managers to remain flexible and adapt to uncertainty." (*Guidelines for Preparation of FEM Plans,* July 1995)

This article will review how an adaptive management approach dealt with two primary factors, a wood supply analysis and the public participation process.

**Wood Supply Analysis** - A regular wood supply analysis is required to determine ecosystem conditions and productivity in order to allow the development of sustainable harvest levels. The forests of Newfoundland have undergone five separate analyses to determine an overview of the supply of available merchantable timber and incorporate a sustainable level of harvest for all forest users.

The first analysis was in 1981 under the direction of the Poole Royal Commission on Forest Protection and Management. This analysis indicated a surplus of timber in Labrador; however, a deficit was projected for insular Newfoundland. Recommendations from this analysis included an aerial protection program against the spruce budworm, expansion of the provincial silviculture program, and the imposition of stricter standards upon the utilization of existing timber stands.

The second analysis was conducted in 1988-89, using up-to-date data on the actual damage caused by the spruce budworm and hemlock looper epidemics. It involved a detailed analysis of the landbase available for timber production in light of various harvesting restrictions.

The third analysis took place in 1996, using new technologies and information that calculated the sustainable wood supply on the basis of individual management districts.

The fourth analysis was undertaken in 2001, for the five-year planning period 2001-2006. Again, this analysis was conducted on a district-by-district approach, where operational and regulatory constraints, environmental constraints, and the current state of the forest were analyzed and evaluated in each district to determine the maximum sustainable harvest levels, and ultimately the annual allowable cut levels.

The fifth analysis was conducted in 2005, for the five-year planning

period 2006-2010. This analysis was made on a district-by-district basis using both an aspatial and spatial analysis. In this review, operational and regulatory constraints, environmental constraints, and the current state of the forest were again analyzed to produce a sustainable aspatial annual allowable harvest. However, new to this wood supply analysis was the development of a spatial component. Using both Woodstock and Stanley computer models, a 25-year harvest schedule was developed for each tenure in the province, allocating actual stands for harvest.

**Public Participation Process** - Early days of commercial harvesting did not involve the general public or many other stakeholders (if any). In addition, forest management plans were ad hoc at best. To ensure sustainable forest management practices were implemented and the concerns of other forest users were identified, changes to past management practices were required. In recent years, forest management plans have become more intensively designed with respect to harvest planning, stand tending, and renewal as well as public input.

Today, five-year plans are developed using the most modern computer technology, taking into account up-to-date scientific data. One of the key components of a successful management plan is stakeholder involvement. Within the province, planning teams are established for the respective forest management districts that comprise various government and non-government agencies. In fact, Abitibi-Consolidated's Newfoundland Woodlands Division started its public consultation process in the mid 1990s. Today, this planning team has grown and remains active into the development of the company's five-year operating plans. This team consists of representatives from the DNR, municipalities, tourism, Wildlife, Mines & Energy, the Outfitters Association, Fisheries & Oceans, Transport Canada, and the Snowmobile Association. There are also individuals who actively contribute to the team, classifying themselves as concerned citizens.

Abitibi-Consolidated's Newfoundland Woodlands planning team is very well structured with detailed ground rules established and implemented to maintain productive meetings. The team meets regularly throughout each year to discuss recent and future forestry activity. Elevated concerns/issues from members are openly discussed and mutual resolution is obtained to facilitate continued operations, resulting in minimum disruption to concerned parties.

## Summary

Over the past century of commercial harvesting for the newsprint industry in Newfoundland and Labrador, corporations have had to make tough decisions regarding their respective operations, which resulted in mergers and acquisitions to ensure their survival. In order to provide a continual supply of quality raw material to the mills, the term "forest management planning" has evolved from felling and extraction to include aspects of social forestry. Today, responsible forest managers have to account for sustainable forest management initiatives by regularly conducting wood inventory analysis, reviewing environmental and wildlife considerations such as pine martin and woodland caribou habitat, and allowing for other stakeholder involvement.

Although not a simple task at the best of times, managers of the forest industry in the province of Newfoundland and Labrador are committed to shaping a successful future that builds on positive past experiences. Adaptive management techniques and sustainable forest management initiatives are some tools being utilized in the present to build roads from the past to the future.

The forest sector has been around for a long time and has made significant changes adapting to today's world. In addition to learning from our past experiences, increased public knowledge and awareness is imperative to the future success of the forestry sector. The concept of adaptive management is a process that is occurring over time. Abraham Lincoln described it well when he said, "The best thing about the future is that it comes one day at a time."

Dave Poole, H.BSc.F, R.P.F. is the Planning Forester/Certification Coordinator with the Newfoundland Woodlands Division of Abitibi-Consolidated Company of Canada.

# The History of Forest Nursery Development in British Columbia:

## A Reflection of Policy and Technology

*by Evert Van Eerden, RPF(ret)*

The catalyst for advances and expansion in BC's reforestation programs and practices, including forest seedling production, invariably can be traced to public policy initiatives. E. (Ted) Knight, former Director of the Ministry of Forests' Reforestation Branch, chronicled the policy milestones relevant to reforestation in BC in *Regenerating British Columbia's Forests*. In his leadoff chapter, *Reforestation in British Columbia: A Brief History*, Knight observes: "British Columbia's reforestation policies and programs have evolved through four distinct stages, each reflecting the political view of forest management at the time." Those four phases were all founded in the findings and recommendations of Royal Commissions of Inquiry into Forest Policy, starting with Fulton (1910 -1912 - first Forest Act), Sloan I and II (1945 and 1955, respectively), and most recently, Pearse (1976). Forest policy developments in BC during the past 100 years confirm a growing political awareness that effective reforestation policies and practices, including the production and planting of forest seedlings on denuded forest lands, are a fundamental cornerstone to a sustainable yield forest policy model.

### Forest Nursery Production in BC - the Formative Years

Recognition of the need for research into the growing and planting of coniferous species precipitated the establishment of a small government research nursery in Victoria, BC in 1926. That test nursery was closed in 1932. The first production nursery was opened at Green Timbers in Surrey, BC in 1930. Another coastal nursery was established at Quinsam near Campbell River in 1939. The production from this nursery provided planting jobs for many men who had become unemployed during the depression, and served to re-establish the Sayward and Campbell River forests that had been decimated by wildfires during the late thirties. Production at the Quinsam nursery was later relocated to its present site at Gordon Road just west of Campbell River. Additional coastal nurseries were established at Chilliwack, Duncan (Koksilah), and Surrey, BC.

Early on, planting was largely confined to the Coast. Into the 1960s, any planting that was done in the Interior mostly relied on stock grown at coastal nurseries. However, there were some pilot planting projects just outside of Smithers, BC from 1961 through 1963, and manual transplanting with transplanting boards was done at the small Telkwa Nursery during spring breakups in the same period. To augment the coastal supply of seedlings for the Interior, the Red Rock Nursery near Prince George was developed and commenced

production in 1967. Additional nurseries were later established in the Interior at Salmon Arm (Skimikin), Vernon, at Harrop (Nelson), and Terrace (Thornhill).

Bareroot was the only stock type available into the early 1970s, after which a gradual conversion to container stock took hold. Of the eleven nurseries brought into production by the Ministry of Forests from 1930 into the 1980s, eight were initially developed as bareroot and transplant nurseries, while the last three (Vernon, Harrop, and Thornhill) were developed exclusively for container seedling production. Six of the eleven MOF nurseries currently remain in production under private ownership.

From very small beginnings in the 1930s, seedling production and planting gradually increased, reaching 75 million seedlings by 1975. This milestone was achieved in part through special funding for the "Habitat" program. From that level, the program rapidly expanded, reaching a peak of seedling production of 305 million seedlings by 1989, facilitated by conversion to container-grown stock and the federal/provincial Forest Resource Development Agreement (FRDA) to address NSR backlog. During the last decade, annual seedling production has hovered in a range of about 220 to 250 million seedlings. In 2007, seedling orders in BC amounted to 260 million.

## Innovation and Technology

Development and testing of container seedling technology as an alternative to bareroot has a long history. In BC, it was the pioneering work by the late Jack Walters of the Faculty of Forestry at UBC, who invented the Walters Planting Gun and Plastic Bullet (1961), and the subsequent development of the "Styroblock" by a CFS/BCFS team led by Jim Kinghorn during the late sixties and seventies that would alter the course of seedling production in BC, much of Canada, and elsewhere. Walters considered that intensive silviculture through mechanization held substantial economic promise for future forest management in BC, and both Walters and Kinghorn recognized that mechanized planting could be a significant boon for coping with rapidly expanding planting programs. By considering the seedling encapsulated in its container, the bullet, and the planting gun as integral components of the same planting implement, Walters envisioned mechanized planting. Various bullets, made from hard polystyrene, biodegradable wood and other materials as well as various planting guns were designed, constructed, and tested. Prototype planting machines with single or multiple planting guns were also designed, fabricated, and tested. Aerial planting with bullet seedlings was also explored. Kinghorn at the Pacific Forestry Centre of the CFS undertook the further development of the Walter's bullet system as a vehicle for bridging the gap between forest researchers and practitioners in 1966/1967. He and his project team in the CFS (Research, Development and Extension work) and BCFS (Field Installations and Nursery Development) soon learned that while foresters appreciated the concept of and potential advantages of container seedling growing and planting, they did not accept the real or perceived root encapsulation of a hard plastic container, albeit in two parts with a slide slit like a clam shell for root egress. Therefore, in subsequent trials, some of the seedlings were removed from their bullet containers and planted alongside bulleted seedlings. Based on the results of those comparisons, a design for a plug container, the "BC/CFS Styroblock" was drawn up in the winter of 1969, and the first 100,000 styroplugs (lodgepole pine) were planted in July, 1970 at McBride Lake near Houston, BC. The plug type of container-grown seedling found wide acceptance, and demand for plugs escalated and soon exceeded traditional BC nursery capacity. Various design refinements, including ribs, many different cavity sizes to facilitate production of various species and seedling sizes, and copper coating of cavity walls to stop root spiraling of some species - mainly pines - have been added over the years but the basic design has endured.

Production and planting of container-grown seedlings has been tried

and implemented in many different places with varying degrees of success. The reasons for and the success of complete conversion from bareroot to styroplugs in BC is attributable to a number of factors, including but not limited to the following:

1. At the outset, working in the coastal climatic conditions enabled developers to produce seedlings in containers that were relatively robust in size compared to other regions.

2. Early recognition that size and quality are equally as important for container-grown stock as they are for bareroot (fitness for purpose).

3. Early awareness that container-grown but "container-less seedlings" when they are planted, need strong and cohesive root systems that maintain plug integrity when they are lifted, packaged, and planted.

4. Species - several of which were difficult to grow as bareroot.

5. Adoption of one container system by the entire industry for a long period of time, providing a common basis for effective information exchange and extension work.

6. Innovation and early emphasis on biology rather than engineering and economics, ultimately followed by gradual transition to production that is dominated by competent commercial operators, who were prepared and able to make the necessary investments.

7. Development at a time when planting was rapidly expanding and demand could not be met with traditional sources of production.

## Privatization

The escalation of planting had necessitated the introduction of contract planting as early as 1968. However, forest seedling production in BC essentially remained the exclusive domain of the MOF into the early 1980s. Two private nurseries, Pelton Reforestation Ltd., which produced mudpacks from base stock supplied by MOF nurseries, and Reid Collins Nurseries Ltd., which raised relatively small amounts of container seedlings grown in paperpots for private clients, were already in production. In 1976, an innocuous recommendation by the Pearse Royal Commission on Forestry: "Government should consider allowing forest seedling production by private nurseries", challenged the MOF monopoly on forest seedling production and changed the course of forest seedling production in the province, ushering in an era of privatization. Acting on the Pearse recommendation, the MOF Deputy Minister of the day, Mike Apsey, appointed a public/private policy committee to make recommendations, and private sector nursery production under contract to MOF commenced in 1981.

Contracts were let only to private contractors who could provide evidence of competency in the production of forest seedlings and/or other conifers. As a result and for a time, MOF growers were in hot demand. To ensure that the program would be successful, private growers were also given the opportunity to take advantage of MOF extension services, and regional grower meetings were held on a regular basis. To facilitate the exchange of technical information, the Forest Nursery Association of BC (FNABC) was formed in 1981, including membership from private and government nurseries and industry suppliers. The FNABC continues until today, holding an annual meeting in different regions of the province. With multiple-year contracts in hand and a progress payment system related to various crop completion phases, private growers were able to secure the necessary financing to build the required nursery infrastructure. Forestry company or licensee nurseries were also granted approval to produce seedlings for their own requirements on the basis of a financial formula that reimbursed approved capital costs plus interest over a twenty-year period and annual production expenses referenced

to MOF equivalent costs. Three licensee nurseries proceeded on this basis while three others started and continued operations without the benefit of that cost recovery program. Three of the six licensee nurseries that were started are still in production today.

In 1987, the BC government of the day undertook further steps to shift responsibility for reforestation in the province to the private sector. First, licensees were authorized to enter into seedling supply contracts directly with the nurseries of their choice. All seedling orders, licensee and MOF, were channeled through the MOF Silviculture Branch and allocated by Branch staff to certain nurseries on the basis of nursery overall space and stock type capacity. Thus, early in the years of container seedling production when capacity for such stock was limited, allocation of container-grown stock was severely rationed. Allowing licensees to deal directly with nursery operators spurred significant private sector investment in and expansion of container seedling growing capacity around the province and removed this capacity restriction.

A second major policy shift in 1987 was the announcement by government that it intended to privatize and sell nine of the government nurseries. One of the nine nurseries, Green Timbers, was ultimately removed from the process because of its historical and urban recreational value, as recommended by at least one of the proponents. After about a year, six of the nurseries were acquired by Pacific Regeneration Technologies Inc. (PRT), an employee-owned company founded by MOF personnel, including Charlie Johnson, Evert (Ev) Van Eerden, and the employees of the six nurseries. No other bidder had expressed an interest in buying a block of six nurseries and keeping much of the original nursery organization together, as had been envisioned by Johnson. This transaction was strongly resisted by existing commercial nurseries, but ultimately proceeded. The remaining two nurseries, Koksilah and Telkwa, were acquired by other purchasers, and both closed within a few years of the sale. Of the three government nurseries that were left, Green Timbers was closed in 1998, but remains as a historical and arboretum site, while the two other nurseries, Skimikin and Surrey, were privatized more recently.

## The Future

Government and industry must maintain their commitment to prompt planting as the proven and most effective practice for establishing the new forest. Carbon offset planting holds a huge opportunity for BC, Canada, and the reforestation industry. Will new methods and technologies for growing seedlings be developed and adopted? Perhaps! Applied genetics and tissue culture (embryogenesis) hold substantial promise for mitigating the impact of forest pests and for improving yield from our future forests. The current difficulties in securing sufficient labour for nurseries and planting, as a result of changing demographics, and extremely favourable economic conditions in other economic sectors, may resurrect the aspirations of Walters and others for more mechanization in reforestation.

Finally, whatever the future holds for forest seedling production and planting, it will always be true that “a poor tree well-planted is better than a good tree poorly planted, but a good tree well-planted is best” (Jack Long, distinguished and long-retired nurseryman with the BC Ministry of Forests).

Evert (Ev) Van Eerden, RPF(ret), can be contacted by e-mail at ev.newgen@shaw.ca.

# MEETING FORESTRY'S SAFETY CHALLENGES

*by Keith Playfair*

Silviculture is vital to forestry, shares its fundamental safety challenges, and from what I see, takes a leadership role in tackling them.

BC's forestry sector is assuming responsibility for safety through the BC Forest Safety Council, whose goal is to eliminate fatalities and serious injuries. Created with support from industry and government, it has a designated seat on the provincial board for the Western Silvicultural Contractors' Association.

Central to the Council's basic goal is its SAFE Companies program. This allows companies to earn certification by showing that their safety program meets realistic standards. The plan is to have every BC forestry operation in the program by the end of 2008 - an objective endorsed by owners and licencees.

So far, thousands of companies have registered and hundreds have taken the training and become SAFE-certified. This is the time to act, whether you've signed up but haven't completed SAFE certification, or haven't registered yet.

Registration brings you important support: a step-by-step workbook to help build or review safety programs; access to free advice from Council safety advocates; and feedback on how to show your safety activities meet industry standards.

It's all practical and doable because SAFE Companies was built with input from contractors and workers who know what happens in the real world. The program is not about jumping through hoops. It's about worker safety.

A few may question the need for the SAFE Companies program because they have good safety records, but is past history a guarantee of future good performance? Others ask, "How hard is it? Will it make my company safer?"

First, the program requires some effort - documenting what may have been done informally before, or putting new procedures in place. But it's necessary, and useful.

Second, SAFE-certified companies enjoy definite payoffs. The most important is obvious - a safety program that protects your workers. Here are others:

• SAFE Companies led one contractor to look closer at his business fundamentals, "the entire operation…managing fuel, people, and every detail." The results were operational improvements he knows paid off.

• Another contractor found his increasingly safety-conscious employees more focused on work. One benefit was less equipment damage; it adds up when you can cut back on some of those $2,000 repair bills for pick-up trucks.

• Safety meetings didn't turn into gripe sessions, as a third contractor had expected. After dealing with safety, workers and the employer talked shop in ways that improved productivity. Safety meetings became useful crew meetings.

Everyone can also count on these benefits:

• More licencees and major companies are making SAFE Certification a condition of bidding or working - some now, others in early 2008. Getting certified sooner puts you ahead of the game.

• Certification makes you eligible for annual WorkSafeBC premium rebates. But you need to be certified by the end of 2007 to qualify for this year's rebate.

That's good news for individual operators, but also for forestry as a whole. Ultimately, safety is about what we do, and our well-being as an industry.

Forestry must act and be accountable for safety collectively. SAFE Companies makes that possible. The only downside is avoiding it. This affects your employees' safety and the health of your business.

The Council is geared up to help you become certified with qualified program staff, effective training, and solid support systems. Now is the time to take advantage of all that to make SAFE Companies work for you.

A key figure in BC's forest sector, Keith Playfair is a principal of the KDL Group of Companies. He serves as a BC Forest Safety Council director, is active in the Central Interior Logging Association and was on the BC government's 2003-04 Forest Safety Task Force. More information on SAFE Companies is at www.bcforestsafe.org.

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